Reconstruction of the Proto-Elamite Harp:

(*ca. 3200-2600 BC*)

Part 2: Reconstruction Notes

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Silver beaker, in the Mahboubian Collection*

Introduction

The reconstruction of a musical instrument based from its iconographic representation on a small silver beaker made some 5,000 years ago is a very complex adventure, and it is more so when the instrument in question is a unique occurrence. Such replication rests on a meticulous observation of the instrument and its comparison with archival material arising from contemporaneous iconography as well as with comparison with ethno-organological collections.

I - *The Sound-box*

The sound-box of the Elamite harp is a straightforward structure composed of half a hollow cylinder on which rawhide would have been stretched, acting as a soundboard, as described with the drawing to the left. The semi-cylindrical structure might have been made from a gouged-out log or from any other suitable material. However, wood would have been the preferred medium because it would have allowed for a wet rawhide soundboard to be affixed to it by means of nails. Then the wet rawhide would have naturally stretched as it dried. Such sound-boxes made from hollowed out or naturally hollow structures of vegetal nature are the most common sound-boxes of most chordophonic instruments from antiquity to modern times. With time, in the modern West, and with manufacturing techniques, sound-boards made from wood replaced rawhide. However, chordophones of the ethno-musicology favour rawhide as it is more easily accessible and does not risk developing cracks and splits with changes in climate hygrometry. Therefore, the sound-box used for the building of the Elamite harp is not a unique phenomenon. However, in its representation on the silver vessel, the artist has represented it curved but I would argue that this was because the curved arm of the harp, or the bow, would have suggested to the artist that the sound-box, too, was curved. I would add, that the making of a curved sound-box would have presented useless complications and problems with the nailing in-place of the soundboard which would have been unstable because of uneven tensions due to that curvature. The ideal material for a curved soundboard would have been wood. However, the techniques for making a board thin enough to amplify the vibration of strings does not seem possible some 5,000 years ago.

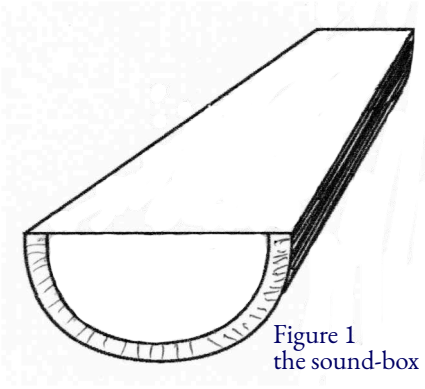

Figure 1
the sound-box

II - *The Bow*

The bow presents problems. While harps with this organological configuration are common in both antiquity and with ethnomusicology, it is the orientation of the instrument in its playing which is exceptional with the Elamite type. In all other known harps the instrument is played with the bow close to the chest of the musician while with the Elamite type, the bow is away from the musician. However, there are some exceptions, notably with an African harp from Uganda, the ennanga. (Figure 3)

Figure 2. Left, Egyptian 18th Dynasty harpist. Right, Elamite harpist, ca.3000 BC

Figure 3. ennanga harp

The bow in the Proto-Elamite model is about twice as long as that with the Egyptian type. The consequence of this difference is that the bow of the Elamite type was flexible while the bow with the Egyptian model was rigid.

III - *The Strings*

Therefore, its is probable that the strings in the Proto-Elamite type would have been much thinner in order to minimise the tension on the bow. Had thicker strings been used, then the tuning of one of the strings would have 'un-tuned' the others. Thus, I contend that one length of twisted sheep gut would have been used while several lengths of the same gut would have been used for the Egyptian model with a rigid bow, as we know from archaeological extant artefacts. A single length of twisted sheep gut would have a diameter of around 0.6 of a millimetre. The diameters measured from remains of strings found in Egyptian archaeology and with ethnomusicology is around 1.20 millimetres. Such a section would create a tension impossible to manage on the Proto-Elamite model.

Now, the difference between ennanga type harps from Uganda and the Proto-Elamite example, is that the Elamite bow rests on the shoulder of the musician while the bottom of the sound-box rests on the ground. It is my contention that this constitutes the main

difference between the Proto-Elamite harp and all other types of harps known from the antiquity or from ethnomusicology. The illustration in figure 4 below shows that the top of the bow is held between the shoulder and the neck/chin of the musician. A rosette prevents the bow from sliding away from that position.

Figure 4. Holding the bow between shoulder and (bearded) chin.

In my reconstruction I have used bamboo for making the bow but it is highly probable that reed (arundo donax) would have been used. The curvature of the bamboo in my reconstruction was crafted by sawing the cane at regular intervals of about two centimetres until the required curvature was reached under the tension of the strings.

Figures 5a, 5b, 5c and 5 d. Figure 5 c shows the rawhide soundboard. Figure 5 d shows details of the tuning method.

IV - *The Bridge*

About the soundboard, it will be noted that although there is no evidence for such from the iconography, I contend that a bridge was affixed to it. The purpose of this bridge (figure 5 c above) placed on top of the rawhide was to prevent prevent the tearing of the hide due to the angle and tension of the strings, in its relation.

V - *Tensing the strings*

The strings are affixed to the bow by means of cotton strips about two centimetres wide, rolled around the cane. Then the sheep's gut string which is tied to a thicker cotton thread is wound several times, at least five, around the cloth and in the same direction the cloth strip was wound. Tuning is achieved by rotating the bundle by gripping it between the base of the thumb and index finger until the correct tension of the string and therefore the pitch is reached. It is worth noting that once the harp has reached an approximate tuning, fine tuning is better achieved by first relaxing the tension of the string and then tense it to a pitch slightly above the target pitch, and then relaxing the tension, delicately, to appropriate pitch. A video of the process is forthcoming.

VI- *Microtonality*

The balance between string tension and bow flexibility is a very subtle exercise with this instrument. The bow is very flexible. Nevertheless, this flexibility allows for the stable tuning of each string because the pulling force exerted onto the bow by one string is insufficient to affect the tuning of the other strings. Prior to my reconstruction, I had anticipated that the flexibility of the bow would have allowed for pitch bending thus allowing for the production of microtones whenever required, as well as vibratos and portamenti. My reconstruction of this remarkable Proto-Elamite harp encourages these delicate tonal variations which might be at the origins of microtonal practice, a characteristic of the music in this part of the world which I will demonstrate on a forthcoming video.

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